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museum, in Dr. Lamborn's collection. But inspection detects glaring contrasts in execution and in detail. The triangular entablatures over the masks are too large and too regular, the masks themselves are not after the trigonometrical style of the Aztec potter, and the mustache-like flaps on the upper lips are strangely inconsistent with any claims for the object as a genuine relic. The expanded flattened chins are anomalous.

The body of the vase, as seen in the cuts, is handsomely ornamented by a face in relief and two semi-disk-shaped annular handles. The face, both as seen in profile and in full view, is not Mexican, and is much too pretty. The fillet surmounting the head should be drawn more closely about the sides of the face, and the V-shaped ends are too large and coarse. The disks attached to the fillet are placed too high, above instead of at or below the ears, and the pendant tassels are abnormally cumbersome. Dr. Plongeon, who agreed with the writer as to the suspicious character of the vase, says that the longitudinal and horizontal bars of these tassels are too few, as they should be respectively five and seven. The handles are very dubious, both from size and ornamentation, while their thin, sheet-like texture is unusual. The legs of the vase are too far under the body of the vase, as in most instances, where present, they sprout from farther up the sides of the object, holding it on inclined supports, and are more usually three in number. The cabalistic ornamentation about and under the vase is significantly coarse and overdone.

The stand, which is seldom found in Mexican pottery, is too elaborate, too highly incised, and false in ornamentation; the markings on its upper surface suggestive of calendar-stones, etc., are simply trifling; and the drop-shaped pellets stuck about it at top and bottom are out of place. The serpents used upon it are wrongly placed; their universal position, I think, being in profile, with usually gaping mouths, while the scroll design between them strikes one as a piece of ingenious but unsuccessful counterfeiting. The whole piece is also too systematically punctured in every part. Since the writer was led to suspect the genuineness of this marvellous production, he has learned from Prof. A. S. Bickmore that Mr. Charnay, in conversation with him, pronounced it a fraud. The aggravated offences so often perpetrated on archeologists by money-making tricksters make it desirable to publish every counterfeit of any importance, both as a warning to the community, of cheats, and as a guide and protection to the less suspicious collectors.

L. P. GRATACAP.

A PETROLEUM STEAMER.

THE petroleum trade between this country and Europe has assumed such large proportions, that cheaper means of transportation than the ordinary plan of carrying the oil in wooden casks or metal cases are desirable. Attempts in this direction have been made by fitting ships with cylindrical or rectangular iron tanks, but to this method there were many grave objections. With cylindrical tanks, no matter how closely packed, the result is, that, allowing for the weight of the tanks themselves, the vessel can carry but little more than half her dead-weight capacity. Rectangular tanks, fitting more snugly together, are better in this respect. But in both systems there is considerable loss by leakage; and in the spaces between the tanks, inflammable and explosive gases may be generated, becoming a source of danger.

The attention of ship-builders having been drawn to this important subject, the result is, that a new type of steamer has been devised and constructed for the special purpose of carrying oil in bulk. The *Gluckauf*, the first vessel of the new type, was built at Newcastle-on-Tyne, to the order of a German firm, and launched last June. She recently completed her first round trip between this port and Germany with a full cargo of oil, and sailed a few days ago for Bremerhaven with her second cargo. The experiment has proved a complete success; and it is stated that other steamers of the same kind, with such modifications of detail as experience suggests, will be built, thus to some extent revolutionizing the oil-carrying trade.

The *Gluckauf* is an iron steamer three hundred feet in length, and of three thousand tons burden. Externally she has the appearance of an ordinary freight-steamer, except that her smoke-stack is much farther aft, and her half-deck extends forward of the mainmast. Internally she presents some novel features. The coal-bunkers, boilers, and engines are at the extreme stern, in a compartment entirely separated from the rest of the vessel by a water-tight bulkhead. Forward of this bulkhead she is divided into eight oil compartments—four on a side—by transverse and longitudinal bulkheads extending from the ship's bottom to the main deck, two feet above the water-line. From each of these compartments a trunk about eight feet square extends up through the 'tweendecks. These trunks allow of expansion or contraction of the cargo from variation of temperature, and also carry off all volatile gases which may be formed. When loaded, the oil fills the compartments, and extends halfway up the trunks, so that the only surface of oil exposed to

the air or to change of position by the rolling of the ship is that in the trunks. As the cargo is in contact with the skin of the vessel, its temperature will never differ materially from that of the sea. As the bulkheads are water-tight, or rather petroleum-tight, the vessel is practically unsinkable; and, as there is scarcely any woodwork about her, the risk of fire is reduced to a minimum. The Gluckauf is provided with powerful pumping appliances, so that her cargo can be loaded or discharged in a single day, which is another very economical feature as compared with the slow process of handling casks or cases. Altogether the new type of steamer admits of a great reduction in the cost of oil transportation; the only drawback to the system being that such a vessel can get no return cargo, being compelled to make one-half of every round trip in water ballast. But this is not a very important point, as most of the vessels at present in the oil-trade between this port and Europe bring back nothing but empty oil-casks.

THE GUADALAJARA POTTERY.

IN a recent number of *Science* the editor, in commenting upon the anthropological section of the American association, says, "Its popularity is at once a good and an evil; its good consists in attracting general attention to the variety and importance of the problems connected with man; its evil, in that this variety and interest are apt to give admittance to papers of too vague and pointless a character, which have no place in the sciences, and neither bring nor suggest any thing new." It may be suggested, in connection with these facts, and bearing upon them, that in a meeting of that character, as well as in the ordinary routine of scientific work, two distinct classes of men are working together, — the collector and the systematizer. From each of these an increased degree of accuracy, as well as greater comprehensiveness, is demanded by the steady advance of science. If we are to reconstruct the history of the past from a study of the present, it is especially necessary that the collector understand the demands resulting from previous researches. Nowhere in the world is better systematizing work in anthropology done than in the United States; and, in order to bring about the reform hinted at above, it is only necessary that the men who take the field as collectors understand the wants of those in charge of our great museums. Officers of the army, navy, and civil service, members of the consular and diplomatic corps, missionaries, and private citizens, show the greatest willingness to enlarge the collections in our museums; and

the information they desire as to how their work shall be most effectively should be furnished them.

One of the rules prevailing under the new order of things is, make your observations and collections exhaustive. When Professor Putnam, or Dr. Matthews, or Mr. Holmes describes a mound, a Navajo silversmith, or a savage potter, he adopts the method of the anatomist at the dissecting-table, and leaves out not a single item of description. In fact, a good mechanic, with the aid of one of their monographs, can reproduce the thing described. After reading such a description, if one opens a grave or a mound and finds certain pottery or rude jewelry, he is in a position to begin reconstructing the whole social fabric of those who made them.

The accompanying sketches have been prepared for the purpose of showing the results of collecting according to the rule mentioned. Last summer, in the interest of the national museum, Dr. Edward Palmer visited Panteleon Panduro, the noted potter of Guadalajara, Mex., and succeeded in procuring samples of the clay used, in different stages of preparation; the spatulas, brushes, polishers, and scrapers employed; a model of the kiln in which the pottery is fired; and samples of handiwork in various stages of finish. If the tools and the objects collected were placed in the hands of a skilled potter, together with the manuscript description of the process of manufacture, he would have no difficulty in putting himself into technic sympathy with Panduro.

An excellent lesson in the history of civilization is taught by this particular exhibit. You have before you the hand-worked paste, the stone-polisher, the rude wooden shaping and marking tools of the ancient Aztec and Maya workman. The open furnace, in which the ware can be hardened but not glazed, cannot be much further advanced than those of Panduro's ancestors.

One interesting feature shown by the collection is the fading-out of aboriginal forms and patterns, and the substitution of those belonging to civilized life. The modern Guadalaran delights in statuary, and his portraiture is astonishingly lifelike. His copies of modern vessels are graceful, and delicately ornamented. An amusing feature in the work of the potter is that he does not model *en bloc*, as we do, but makes his bodies, heads, etc., separately, putting the parts together and clothing the figure afterwards.

In zoölogical language, this exhibit is an ontogenetic study. It is the biography or life-history of a single operation. The collection of a hundred such exhibits, from every part of the world, and the comparison of their details, would enable the philosophical ceramist to study pottery philo-